PDelivery Final Report

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1) Motivation and Requirements

- Our Project focuses on the issue of how cargo companies, such as DHL, XPO, and Ups, charge so much for a service that almost everyone can do. Another problem is that cargo companies are restricted by working hours which hinders a lot of people from getting what they need at the time they need.
- PDelivery is a tool that allows shoppers to connect with travelers.PDeli allows travelers to make a profit while allowing shoppers to not only save money but also get what they want! It also allows shoppers to put in the items they need, examples of the items, and also pictures of the items!

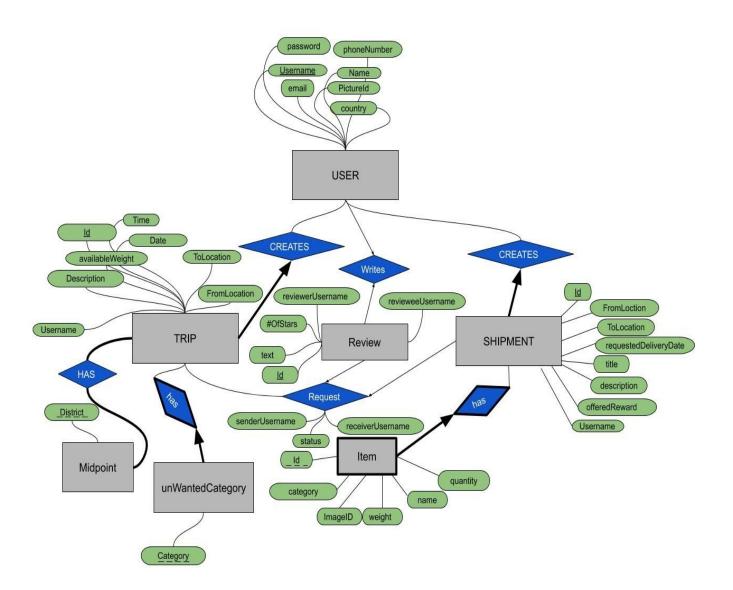
Requirements(Users will be able to..)

- A user could create a trip while specifying the categories he/she is not willing to deliver.
- A user provides information about the package, its weight, the date, and the reward he is willing to give.
- A user will be able to search for trips, and he will be presented with all the shipments that are available to deliver to that location.
- A user will be able to search for shipments that need to be delivered to a specific location.
- A user will be able to review another user when both complete a deal.
- A user will be able to deliver more than one packet. Hence, maximizing his/her profit.
- See suggested trips/shipments made based on his previous behaviors.

2) Conceptual Database Design

- Each User has a username, name, password, phoneNumber, email, location, Birthday.
- Each Trip has an Id, from, to, date, time, availableWeight, description, and username.
- Each Shipment has an Id, from, to, requestedDeliveryDate, title, description, offeredReward, and username.
- Each Item has an id(partial key), a category, weight, a name, and a quantity.
- Each Review has an id, text, #OfStars, reviewerUsername, and revieweeUsername.
- Each Destination has a city/district.
- Each unWantedCategory has a category.
- Each User could create zero or more trips, but a Trip could be created by only one user.
- Each User could create zero or more shipments, A shipment could be created by only one user.
- Each User can review another user after a transaction(deal) is done.
- Each Trip has one(at least one) or more destinations.

- Each Trip has zero or more unwanted categories.
- Each Shipment has one(at least one) or more items.
- Each Item must belong to a shipment
- FINAL VERSION OF ER:



3) Logical Database Design

• Initial Mapping of the ER Diagram into Relational Model

Create table if not exists User(

Username VARCHAR(50),

```
Name VARCHAR(50),
      Password VARCHAR(255) NOT NULL,
      Email VARCHAR(100) UNIQUE NOT NULL,
      Country VARCHAR(50),
      PhoneNumber VARCHAR(20),
      Birthday DATE,
      PRIMARY KEY (Username)
);
Create table if not exists Shipment(
      ID INTEGER AUTO INCREMENT,
      Username VARCHAR(50),
      FromLocation VARCHAR(20) NOT NULL,
      ToLocation VARCHAR(20) NOT NULL,
      RequestedDeliveryDate Date NOT NULL,
      Title VARCHAR(100) NOT NULL,
      Description_ VARCHAR(250) NOT NULL,
      OfferedReward DECIMAL(10, 2) NOT NULL,
      PRIMARY KEY (ID),
      FOREIGN KEY (Username) REFERENCES User(Username) ON
DELETE CASCADE
);
Create table if not exists Item(
      ID INTEGER AUTO_INCREMENT,
      shipmentID INTEGER,
      Category VARCHAR(15) NOT NULL,
      ItemLink VARCHAR(300),
      Weight INTEGER NOT NULL,
      Name VARCHAR (50) NOT NULL,
      Quantity INTEGER NOT NULL,
      PRIMARY KEY (ID, shipmentID),
      FOREIGN KEY (shipmentID) REFERENCES Shipment(ID) ON DELETE
CASCADE
);
Create table if not exists Trip(
      Id INTEGER AUTO_INCREMENT,
      Username VARCHAR(50),
      FromLocation VARCHAR(20) NOT NULL,
      ToLocation VARCHAR(20) NOT NULL,
      Date DATE NOT NULL,
```

```
Time Time NOT NULL.
      AvailableWeight INTEGER NOT NULL,
      Description VARCHAR(250) NOT NULL,
      unWantedCategories VARCHAR(300),
      PRIMARY KEY(Id),
      FOREIGN KEY (Username) REFERENCES User(Username) ON
DELETE CASCADE
);
Create table if not exists Midpoint(
      District CHAR(20) NOT NULL,
      TripID INTEGER AUTO INCREMENT,
      PRIMARY KEY (District, TripID),
      FOREIGN KEY (TripID) REFERENCES Trip(ID) ON DELETE CASCADE
);
Create table if not exists Review(
      ID INTEGER AUTO_INCREMENT,
      TripID INTEGER,
      ShipmentID INTEGER,
      reviewerUsername VARCHAR(50), ##NEW
      revieweeUsername VARCHAR(50), ## NEW
      NumOfStars INTEGER NOT NULL,
      Text VARCHAR(500) NOT NULL,
      PRIMARY KEY (ID, TripID, ShipmentID),
      FOREIGN KEY (ShipmentID) REFERENCES Shipment(ID),
      FOREIGN KEY (TripID) REFERENCES TRIP(Id),
      FOREIGN KEY (reviewerUsername) REFERENCES USER(Username)
ON DELETE SET NULL,
  FOREIGN KEY (revieweeUsername) REFERENCES USER(Username) ON
DELETE SET NULL
);
Create table if not exists Request(
      ID INTEGER AUTO_INCREMENT,
      TripID INTEGER,
      ShipmentID INTEGER,
      senderRev INTEGER,
      receiverRev INTEGER,
      senderUsername VARCHAR(50),
      receiverUsername VARCHAR(50),
      status INTEGER,
      PRIMARY KEY (ID),
```

```
FOREIGN KEY (TripID) REFERENCES TRIP(Id),
```

FOREIGN KEY (ShipmentID) REFERENCES Shipment(ID),

FOREIGN KEY (senderUsername) REFERENCES USER(Username) ON DELETE SET NULL,

FOREIGN KEY (receiverUsername) REFERENCES USER(Username) ON DELETE SET NULL,

FOREIGN KEY (senderRev) REFERENCES Review(ID) ON DELETE SET NULL.

FOREIGN KEY (receiverRev) REFERENCES Review(ID) ON DELETE SET NULL

);

Functional Dependencies

- 1) User table
 - a) $\{ID\} \rightarrow \{username\}$
 - b) $\{ID\} \rightarrow \{Email\}$
 - c) $\{ID\} \rightarrow \{phoneNumber\}$
 - d) $\{ID\} \rightarrow \{username, Email, phoneNumber\}$
 - e) {ID, username} → {Email, phoneNumber}
 - f) $\{ID, Country\} \rightarrow \{phoneNumber\}$
 - g) {ID, Country} → {username, Email, phoneNumber}

2) **Shipment** table

- a) {ID} → {Username, FromLocation, ToLocation, RequestedDeliveryDate, Title, Description, OfferedReward}
- b) {ID} → {FromLocation, ToLocation}
- c) {ID} → {RequestedDeliveryDate}
- d) $\{ID\} \rightarrow \{Username\}$
- e) {ID} → {OfferedReward}
- f) $\{ID\} \rightarrow \{Title, Description\}$
- g) {ID, Username} → {FromLocation, ToLocation,
 RequestedDeliveryDate, Title, Description, OfferedReward}

3) Item table

- a) $\{ID\} \rightarrow \{category\}$
- b) $\{ID\} \rightarrow \{category\}$
- c) $\{ID\} \rightarrow \{category, weight\}$
- d) $\{ID\} \rightarrow \{category, weight, Name\}$
- e) $\{ID\} \rightarrow \{category, weight, Name, Quantity\}$
- f) {ID, Name} → {Category}
- g) $\{ID, Name\} \rightarrow \{weight\}$

h) {ID, Name, quantity} → {weight}

5) **Trip** table

- a) {ID, Username} → {FromLocation, ToLocation, Date, Time, AvailableWeight, Description, Categories not wanted}
- a) $\{ID\} \rightarrow \{FromLocation, ToLocation\}$
- b) $\{ID\} \rightarrow \{Date, Time\}$
- c) {ID} → {AvailableWeight}
- d) $\{ID\} \rightarrow \{Description\}$
- e) {ID} → {Categories not wanted}
- f) {ID} → {FromLocation, ToLocation, Date, Time, AvailableWeight, Description, Categories not wanted}

6) MidPoint table:

- The relation has no functional dependencies since it is a **full-keyed** relation.

7) Review table:

- a) {ID, tripID, shipmentID} → {reviewUsername, revieweeUsername}
- b) $\{ID, tripID, shipmentID\} \rightarrow \{text\}$
- c) {ID, tripID, shipmentID} → {text, NumOfStars}
- d) $\{ID, TripID\} \rightarrow \{ShipmentID\}$
- e) {ID, tripID, shipmentID} \rightarrow {reviewUsername, revieweeUsername, text, NumOfStars}

f)

8) **Request** table:

- a) {ID} → {TripID, ShipmentID, senderRev, ReceiverRev, senderUsername, receiverUsername, Status}
- b) {ID, TripID, Shipment} → {SenderRev, ReceiverRev, senderUsername, receiverUsername, Status}

Normalization

1) User table

- a) The table is in BCNF because there are no bad FDs. All the FDs contain the ID attribute on the left. Therefore, to prove that the table is in BCNF it is enough to show that the closure of the ID attribute contains all the attributes in the table. See the closure of the ID attribute below:
 - i) {ID}⁺ = {username, Email, phoneNumber}

2) **Shipment** table

a) The table is in BCNF because there are no bad FDs. All FDs contain the ID attribute that its closure contains all attributes.

the closure of the ID attribute below:

- (ID)* = {FromLocation, ToLocation, RequestedDeliveryDate, Title, Description, OfferedReward}
- 3) Item table
 - a) The table is in BCNF since there are no bad FDs. The primary attribute's closure, that is ID, covers all of the table's attributes. the closure of the ID attribute below:
 - i) {ID}⁺ = {category, weight, Name, Quantity}}
- 4) **Trip** table
 - a) The table is in BCNF(for the same reasons as the tables above), however, it is not in NF1. The reason is the attribute's, 'CategoriesNotWanted', values are not atomic. We fix this problem by decomposing the table into two tables that are both in BCNF and NF1.
 - First table: Trip(ID, FromLocation, ToLocation, Date, Time, AvailableWeight, Description)
 - ii) Second table: unwantedCategory(TripID, category)
 - (1) This table is fully-keyed, and hence has no FDs at all.
- To show that the decomposition is lossless and the that it is dependency preserving, we provide the following example:
 - Below we show some tuples for each table:
 - unwantedCategory

TripID	Category		
1	Food		
2	Elec.		

- Trip

ID	Usern ame	From Locatio n	ToLocatio n	Date	Time	Available Weight	Description
1	Khaled	Egypt	Turkey	2020- 08-11	12:10:00	15	I will travel, anything to deliver?
2	Asem	Egypt	Turkey	2020- 08-11	12:10:00	15	I will deliver that for you

- When join is applied here, see the table below, all FDs still hold. So, the **decomposition is lossless**.
- And we added already tuples to each table, and performed join as shown below, and the FDs are not violated. So, the decomposition is dependency preserving.

ID	Usern ame	From Location	To Location	Date	Tim e	Available Weight	Description	Tripl D	Category
1	Khaled	Egypt	Turkey	2020 -08-1 1	12: 10: 00	15	I will travel, anything to deliver?	1	Elec.
2	Asem	Egypt	Turkey	2020 -08-1 1	12: 10: 00	15	I will deliver that for you	2	Food

5) MidPoint table

a) The table is in BCNF since it is a fully-keyed relation, meaning that there are no bad FDs for this table, and hence there are no bad FDs.

6) Review table

- a) This table is in BCNF as it also has an ID attribute that ensures there are no bad FDS. If its closure is produced, it would also cover all the attributes.
 - This table's closure: {ID}* = {tripID, shipmentID, reviewUsername, revieweeUsername, text, NumOfStars}

7) Request table

- a) The table is in BCNF since all the FDs are good. All FDs contain the column ID on the left, and the closure is:
 - i) {ID}* = {TripID, ShipmentID, senderRev, ReceiverRev, Sender, Receiver, Status}

4) Application Design and Implementation

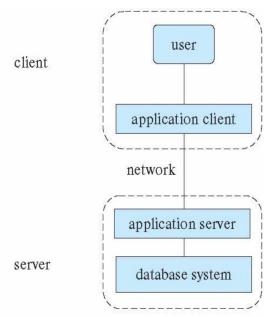
Architecture

 The architecture of this project is three-tier. The three layers are: presentation(application client), business logic(application server), and a database layer(database system). The graph below shows clearly the layers.

- Application

Client(presentation layer): this layer is responsible for presenting the information about the services the application provides. It servers static files requested from the application server over the network.

 Application server(business logic layer): this layer is responsible for controlling the application's functionality. This layer handles the requests coming from the application client layer.



Database System: this layer
is responsible for storing the data. Here, we define our schemas so the
application server could query any data while considering the schema of
the tables.

SQL queries

 Validating a user (condition here could be one of two columns: username, or email)

select *

from User

Where condition = usernameOrEmail

- Registering a user
 - Check for validity of an email

select *

from User

where Email= {email}

- Check for the availability of a username

select *

from User where Username= username

Inserting a user

insert User(Name, Username, Email, Password, Country, PhoneNumber, Birthday, isActive) values(name, username, email, password, country, phoneNum, birthday, True)

- Getting all information about a user

select *

from User

where Username = username

- Getting the trips of a user

select *

from Trip

where Username = username

- Getting the shipments of a user

select *

from Shipment

where Username = username

- Getting the reviews of a user

select *

from Review

where revieweeUsername = username

- Getting the requests of a user

select * from

Request

where senderUsername=username

receiverUsername=username

- Inserting a request

insert into Request(TripID, ShipmentID, senderUsername, receiverUsername, status) values (tripId, shipmentId, 'shipmentOwner, tripOwner, status)

Update a request on acceptance

UPDATE Request

SET status = status

WHERE ID = regld

- Update a request on decline

UPDATE Request

SET status = status + status

WHERE ID = regld

- Delete a request on Cancelation

Delete

From Request

WHERE ID = reqld

Add a review

insert into Review(tripID, ShipmentID, reviewerUsername, revieweeUsername, NumOfStars, Text) values(TripID, ShipmentID, reviewerUsername, revieweeUsername, NumOfStars, Text)

 Suggesting trips & shipments to users (the following is only for the trips, the queries of the shipments are similar)

select FromLocation

from trip as t, User as u

where t.Username= username and u.Username = username

UNION

select ToLocation

from trip as t, User as u

where t.Username = username and u.Username = username

UNION

select FromLocation

from trip as t, User as u

where u.Username = username and FromLocation= u.Country

UNION

select ToLocation

from trip as t, User as u

where u.Username = username and ToLocation= u.Country

- With the result of the above query(countries the user is interested in) we suggest trips for a user:

select *
from trip
where Username != username and (ToLocation =
country or FromLocation = country

 Handling a search(the following is for the shipments, the trips' is similar)

select *

from Shipment

where Username != username and FromLocation = from and ToLocation = to and RequestedDeliveryDate <= date

- Updating Information of a user

UPDATE User

set Name = name, Email = email, Country=location where Username = username

- Insert a trip

insert Trip(Username, FromLocation, ToLocation, Date, Time, AvailableWeight, Description) values(username, from, to, date, time, weight, description)

- Insert unWanted categories

insert unwantedcategory(tripID, Category) values(tripid, category)

Insert Midpoints

insert midpoint(District, TripID) values(district
id)

Insert a shipment

insert shipment(Username, FromLocation, ToLocation, RequestedDeliveryDate, Title, Description_, OfferedReward) values(username, from, to, date, title, description, reward)

Insert Items

insert item (shipmentID, Category, Weight, Name, Quantity, ItemLink) values (id, category, weight, name, quantity, itemlink)

- Get all midpoints of a trip

select District from Midpoint where TripID = id

Get unwanted categories of a trip

select Category from UnWantedCategory where tripID = id

- Get items of a shipment

select *
from Item
where shipmentID = id

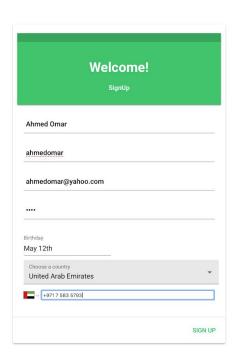
- Programming Languages and DBMS
 - Programming Languages: Python(Flask framework) and Javascript(ReactJs framework)
 - **DBMS**: MySQL

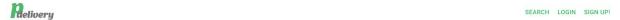
Data size and Source

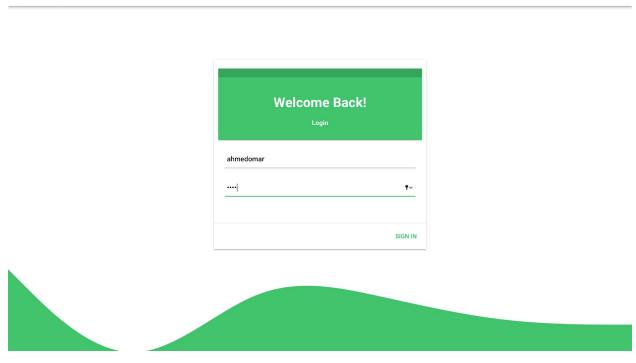
- No, we have not fetched any data.
- Yes, we have entered the data manually since there was no proper way for us to randomly fill the database with the data while maintaining the logic of them. We already had quite some data since we kept populating the database while testing the website's functionality.

Features

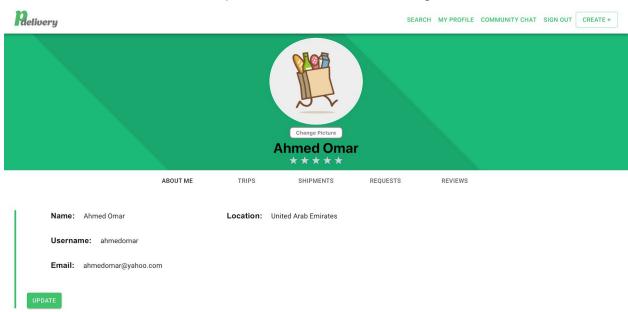
- **SignUp**: Here we sign up a user, then log in the newly created user.



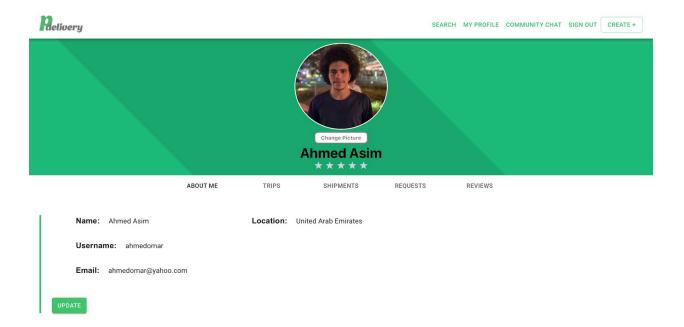




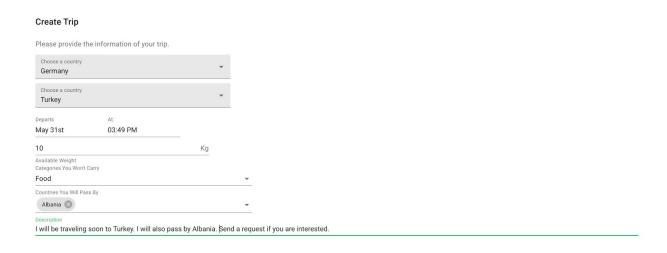
- The user's profile looks like the following:



- The user may update his information or his profile picture:

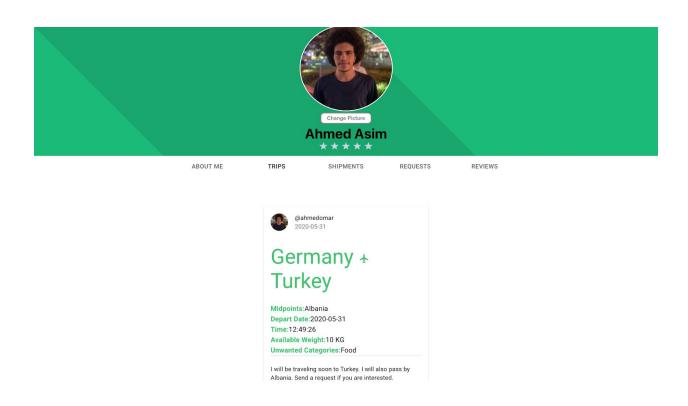


- The user may create a Trip:

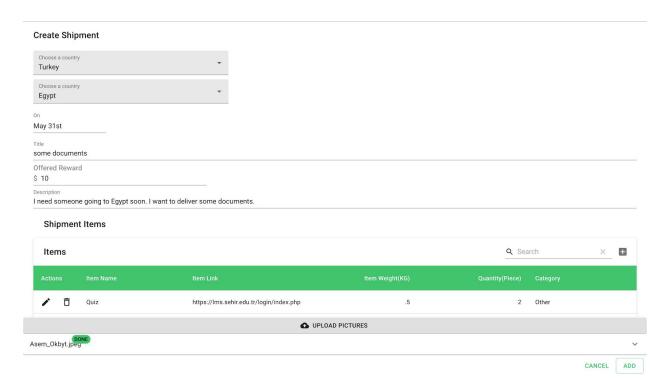


CANCEL ADD

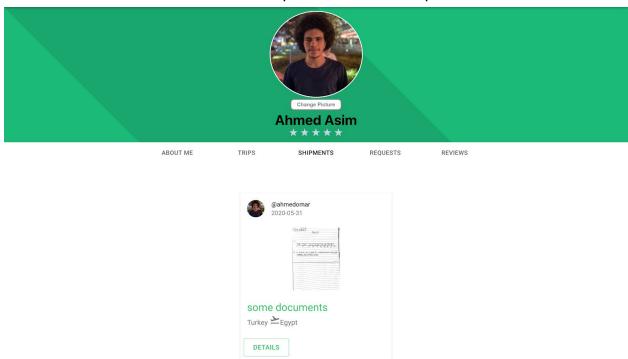
- The user can then display his trips in his profile:



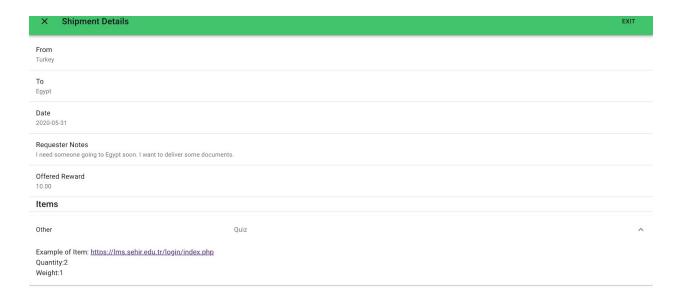
- The user may create a shipment:

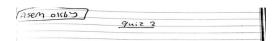


- Then view it on his profile as with the trip:

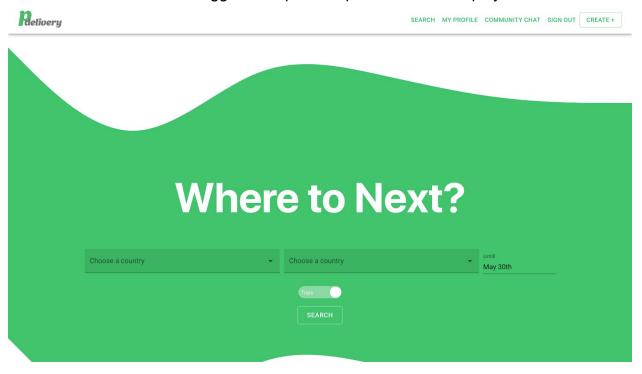


- also, a user could display the details of the shipment:

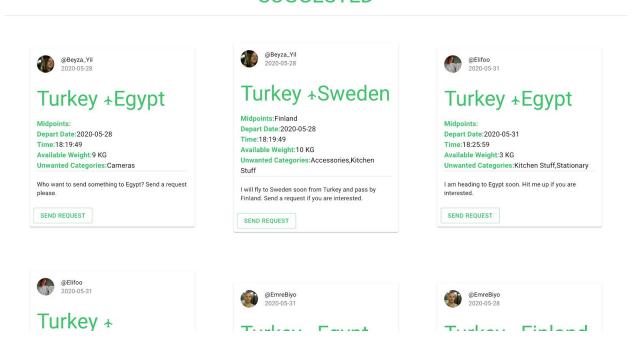




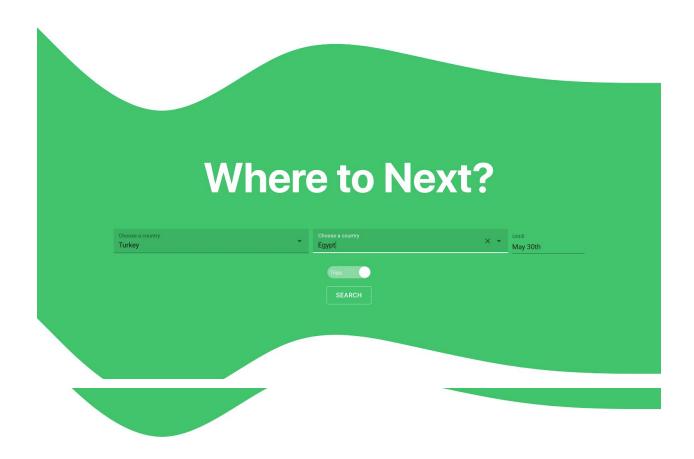
- A user may go on search for a trip or a shipment, but before this some suggested trips or shipments will be displayed:



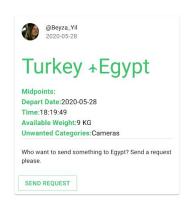
SUGGESTED



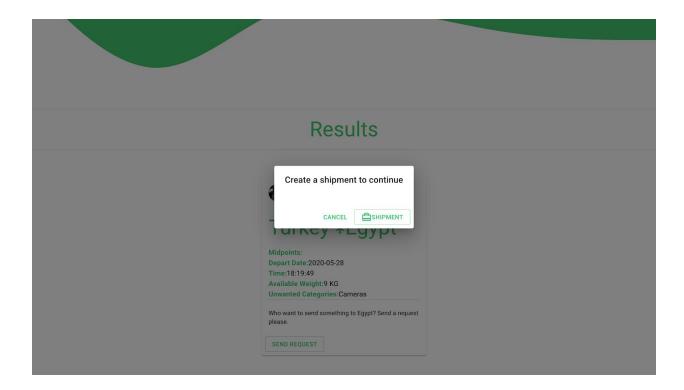
- If the user wishes to search for a specific trip or shipment:



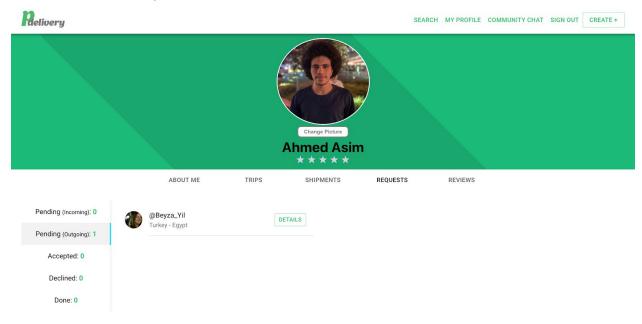
Results



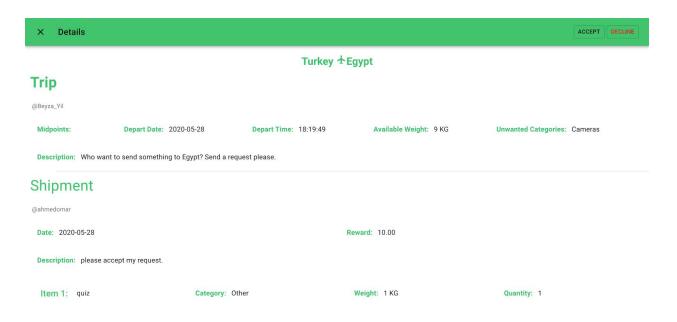
- Then, the user may send a request. Before this the user will be asked to create a shipment if it is a trip and create a trip otherwise:



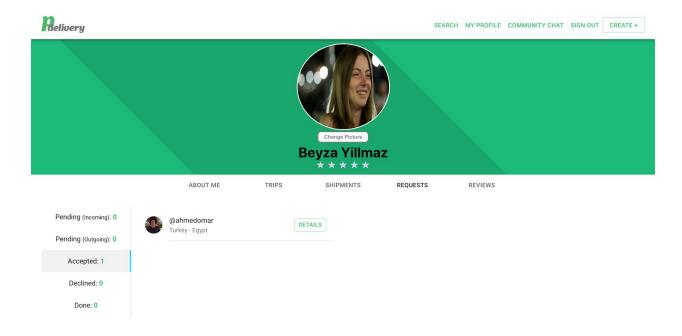
When done, the user will be able to view the requests in his/her profile.



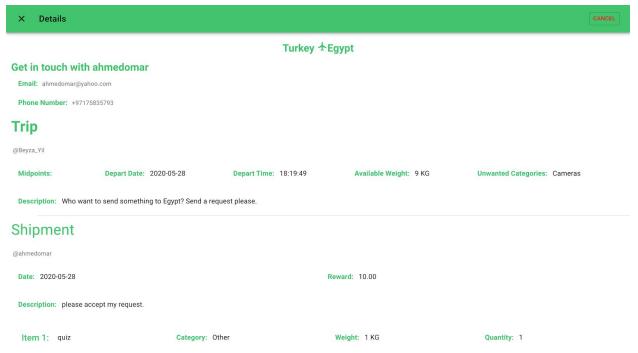
- The other person will be able then to view the details of the request, and decline or accept.



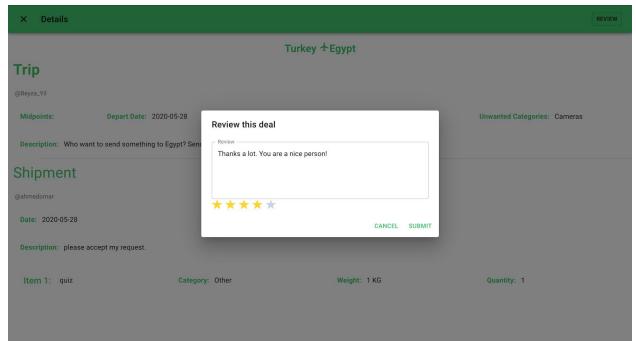
 When the other person accepts the request, it is moved to the accepted requests tab.



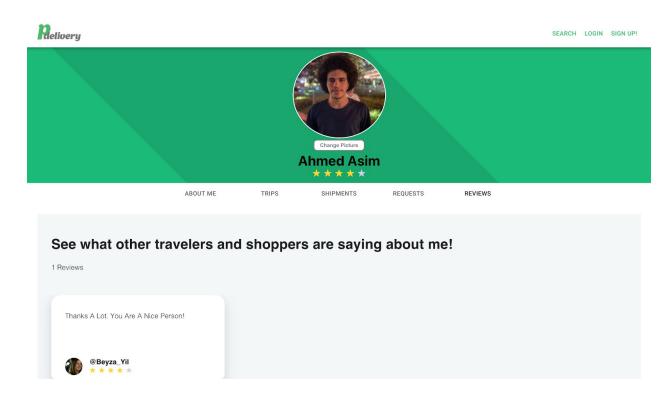
- Now, if the user clicks on Details of an accepted request, the contact information of the other person is displayed.



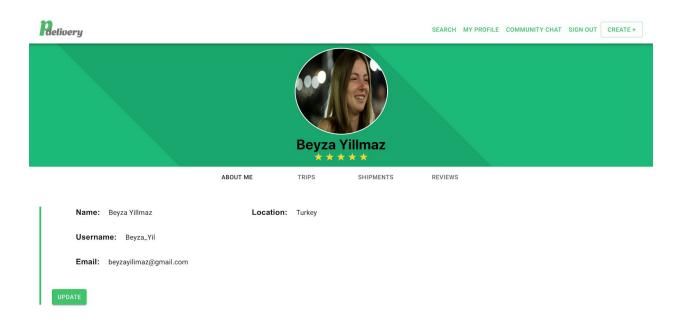
- Finally, when the deal is completed, the request will be moved to the Done tab, and both users will be able to review each other.



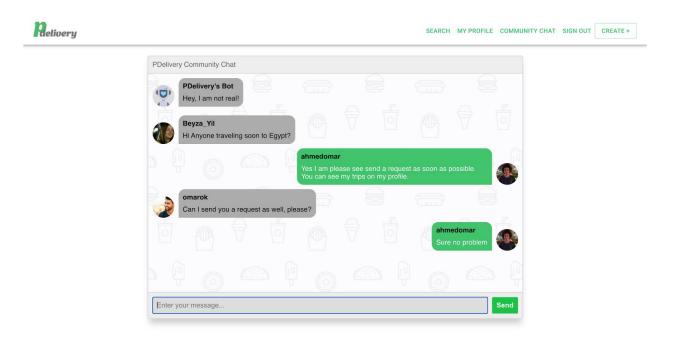
- Then the review will be displayed on the user's profile, and the user's rating will be affected.



- Users may also display other users' profiles.



- Finally, the users may participate in a community chat.



Thank you for reading!